

Texas State Soil and Water Conservation Board
State Nonpoint Source Grant Program
FY 2022 Workplan 22-52

SUMMARY PAGE			
Title of Project	Regional Agricultural BMP Planning Database		
Project Goals	<ul style="list-style-type: none"> Gather existing peer-reviewed data on the effectiveness of agricultural BMPs for reducing pollutant loads Conduct a meta-analysis to generate information for watershed planners and implementers to use in planning activities or load reduction calculations Share data and tools with the watershed planning community 		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Database Development and Publication; (4) Application, Education, and Outreach		
Measures of Success	<ul style="list-style-type: none"> Development of a database with peer-reviewed results of pollutant load reductions from agricultural BMPs. Statistical characterization of results and interpretation for application by planners and implementers. Demonstration of results to the planning community. 		
Project Type	Implementation (); Education (x); Planning (); Assessment (); Groundwater ()		
Status of Waterbody on 2020 Texas Integrated Report	<u>Segment ID</u>	<u>Parameter of Impairment or Concern</u>	<u>Category</u>
	Statewide	Indicator Bacteria	5
	Statewide	Nutrients	5
Project Location (Statewide or Watershed and County)	Statewide		
Key Project Activities	Hire Staff (); Surface Water Quality Monitoring (); Technical Assistance (); Education (x); Implementation (); BMP Effectiveness Monitoring (); Demonstration (); Planning (); Modeling (); Bacterial Source Tracking (); Other (x)		
2017 Texas NPS Management Program Reference	<ul style="list-style-type: none"> Component 1 (LTG Objectives 2 and 3; STG 2B, 3C, 3D) Components 2 and 3 		
Project Costs	\$87,016		
Project Management	<ul style="list-style-type: none"> Texas A&M AgriLife Research, Texas Water Resources Institute 		
Project Period	March 1, 2022 – February 28, 2024		

Part I – Applicant Information

Applicant							
Project Lead	Michael Schramm						
Title	Research Specialist III						
Organization	Texas A&M AgriLife Research, Texas Water Resources Institute						
E-mail Address	Michael.schramm@ag.tamu.edu						
Street Address	578 John Kimbrough Blvd., 2118 TAMU						
City	College Station	County	Brazos	State	TX	Zip Code	77843-2118
Telephone Number	979-314-2356			Fax Number	979-845-8554		

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas A&M AgriLife Research, Texas Water Resources Institute	Provide project administration, quality assurance, database development, outreach, and reporting.

Part II – Project Information

Project Type								
Surface Water	<input checked="" type="checkbox"/>	Groundwater	<input type="checkbox"/>					
Does the project implement recommendations made in: (a) a completed WPP; (b) an adopted TMDL; (c) an approved I-Plan; (d) a Comprehensive Conservation and Management Plan developed under CWA §320; (e) the <i>Texas Coastal NPS Pollution Control Program</i> ; or (f) the <i>Texas Groundwater Protection Strategy</i> ?						Yes	No	x
If yes, identify the document.		N/A						
If yes, identify the agency/group that developed and/or approved the document.			N/A			Year Developed	N/A	

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2020 IR	Size (Acres)
Statewide	N/A	N/A	5	N/A

Water Quality Impairment
Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: <i>2020 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.
N/A

Project Narrative

Problem/Need Statement

Limited resources are available for watershed planners and stakeholders to assess the location and scale of agricultural best management practices (BMPs) required to obtain pollutant load reductions needed to achieve state water quality standards. Scenario planning with mechanistic models such as the Soil and Water Assessment Tool (SWAT) can be used to estimate resulting instream water quality based on placement and amount of BMPs in a watershed. The accuracy and effectiveness of these modelling approaches are contingent on the modelling technician and can be prone to over- or underestimation of load reductions depending on the effectiveness of the model parameter calibration process. In order to balance cost, complexity, and uncertainty, the Bacteria Total Maximum Daily Load (TMDL) Taskforce suggested the use of simpler tools as a first step where appropriate to assess needed load reduction (Jones et al. 2007). As a result, many watershed protection plans (WPPs) and TMDL I-Plans use a combination of Load Duration Curves (LDC) and the Spatially Explicit Load Estimate Calculation Tool (SELECT) to estimate needed loading reductions and prioritize BMP and management measure placement. This approach is appealing because it is easily communicated with stakeholders and efficiently moves the planning process forward towards implementation.

The use of LDCs and SELECT are reliable and replicable ways of estimating needed load reductions and spatially allocating loads and practices. However, the planning of the number of agricultural BMPs required to achieve load reductions can be biased based on the studies selected or information available to the planner and stakeholder group. Furthermore, the estimated percent load reductions from agricultural BMPs are typically re-estimated (or likely copy-pasted) with each new WPP. A centralized and updated database of potential pollutant load reductions resulting from agricultural BMPs would provide an unbiased source of reference and streamline work effort for future WPPs and TMDL I-Plans.

References:

Jones, C., Wagner, K., Di Giovanni, G., Hauck, L., Mott, J., Rifai, H., Srinivasan, R., Ward, G. (2007). *Bacteria Total Maximum Daily Load Task Force Final Report*. Texas Water Resources Institute for the Texas Commission on Environmental Quality and the Texas State Soil and Water Conservation Board. Technical Report TR-341. <https://hdl.handle.net/1969.1/86092>

Project Narrative

General Project Description (Include Project Location Map)

The goal of this project is to develop a reference database that catalogues different BMPs implemented in Texas and their performance in improving water quality. To accomplish this, TWRI will identify agricultural BMPs implemented in Texas and neighboring states (in cases where climatic and ecological sites/soils are similar) by carrying out a comprehensive assessment of peer-reviewed scientific literature and results of field experimental investigations on the impacts of management measures in reducing nutrient, sediment, and pathogen loads. Published studies for potential inclusion will be found by searching leading academic databases such as Google scholar, Web of Science, and Scopus. Results from experimental trials will be collated from agricultural research stations in the state such as those at Riesel and Vernon, TX, among others. Study inclusion criteria will adhere to TCEQ protocols for acquired data, as well as standards that govern systematic reviews and meta-analyses. To evaluate the relative effectiveness of different practices in reducing pollutant loads, the quality assured pooled data will be meta-analyzed to develop representative statistics of typical load reductions attributed to agricultural BMPs. Results of the statistical analysis will be inventoried in an easy-to-use database. Outreach aimed at popularizing the database amongst potential users will involve sharing results of the analysis and applications of the database in webinars, or other related public forums and publishing findings of the analysis in a peer reviewed journal that has a wide reach in Texas and in neighboring states.

The project shall consist of:

1. QAPP – describe general method and sources of acquired data (Google scholar, Web of Science, keywords used, etc.). Define parameters of interest (nutrients, sediment, pathogens).
2. Data gathering and database development.
3. Published database (e.g., Excel workbook). Will be shared on an open access system such as the Texas Data Repository (<https://data.tdl.org/>).
4. Meta-analysis of gathered research.
5. Produce summary statistics for all the identified BMPs and regression equations as appropriate.
6. Produce technical report on data/methods to estimate load reductions from practices. Include walk through for how a user would use database.
7. Publish results of meta-analysis in a peer-reviewed scientific journal (e.g., *Texas Water Journal* or another applicable journal).
8. Share results via press release and public presentations (e.g., Texas Watershed Coordinator Roundtable, Annual SWCD meeting).

Tasks, Objectives and Schedules			
Task 1	Project Administration		
Costs	\$8,702		
Objective	To effectively administer, coordinate, and monitor all work performed under this project including technical and financial supervision, and preparation of status reports.		
Subtask 1.1	TWRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 1 st of January, April, July and October. QPRs shall be distributed to all Project Partners.		
	Start Date	Month 1	Completion Date
			Month 24
Subtask 1.2	TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.		
	Start Date	Month 1	Completion Date
			Month 24
Subtask 1.3	TWRI will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.		
	Start Date	Month 1	Completion Date
			Month 24
Subtask 1.4	TWRI will develop a Final Report that summarizes activities completed and conclusions reached during the project and discusses the extent to which project goals and measures of success have been achieved.		
	Start Date	Month 1	Completion Date
			Month 24
Deliverables	<ul style="list-style-type: none"> • QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Final Report in electronic and hard copy formats 		

Tasks, Objectives and Schedules			
Task 2	Quality Assurance		
Costs	\$5,221		
Objective	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.		
Subtask 2.1	TWRI will develop a QAPP for activities in Task #3 consistent with the most recent versions of <i>EPA Requirements for Quality Assurance Project Plans (QA/R-5)</i> and the <i>TSSWCB Environmental Data Quality Management Plan</i> . All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the <i>TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)</i> and <i>Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)</i> . [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, <i>Environmental Testing Laboratory Accreditation and Certification</i> , which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required where applicable.]		
	Start Date	Month 1	Completion Date Month 4
Subtask 2.2	TWRI will implement the approved QAPP. TWRI will submit revisions and necessary amendments to the QAPP as needed.		
	Start Date	Month 4	Completion Date Month 24
Deliverables	<ul style="list-style-type: none"> QAPP approved by TSSWCB and EPA in both electronic and hard copy formats Approved revisions and amendments to QAPP, as needed Data of known and acceptable quality as reported through Task #3 		

Tasks, Objectives and Schedules			
Task 3	Database Development and Publication		
Costs	\$43,508		
Objective	TWRI will collate and develop a database of peer-reviewed studies that include measured pollutant load reductions (indicator bacteria, nutrients, and sediment) from agricultural best management practices.		
Subtask 3.1	TWRI will use academic literature searches (with Google Scholar and other available academic search tools) to develop and deliver a database of studies on agricultural BMP effectiveness. The database will be shared via a project website for watershed planners and implementers to use.		
	Start Date	Month 4	Completion Date Month 8
Subtask 3.2	TWRI will conduct a meta-analysis of studies in the database to summarize pollutant load reduction statistics for common pasture, range, and crop practices. The data and statistics for watershed planning pollutant load reductions will be published in a technical report.		
	Start Date	Month 8	Completion Date Month 12
Deliverables	<ul style="list-style-type: none"> Agricultural BMP database (Task 3.1) Technical report (Task 3.2) 		

Tasks, Objectives and Schedules				
Task 4	Application, Education, and Outreach			
Costs	\$29,585			
Objective	Provide information and outreach to watershed professionals regarding the use of database results in watershed planning and implementation activities.			
Subtask 4.1	TWRI will establish a project webpage that will be used to host and share project deliverables with stakeholders. The webpage will be updated throughout the project period as needed.			
	Start Date	Month 1	Completion Date	Month 24
Subtask 4.2	TWRI will inform and present the use of the data generated from the project to watershed professionals in Texas. As appropriate, TWRI will present findings and applications at the Watershed Coordinator's Roundtable, Watershed Short Course, webinars, and <i>Texas Water Journal</i> or other publications.			
	Start Date	Month 12	Completion Date	Month 24
Deliverables	<ul style="list-style-type: none"> • Project webpage (Task 4.1) • At least one presentation at watershed planners event (Task 4.2) • Submit draft peer review article (Task 4.2) 			

Project Goals (Expand from Summary Page)
<p>By providing a reference database of the pollutant load reduction effectiveness of BMPs within the region, this project will help ensure that science-based standards are utilized in the development of watershed-based plans. The resource will help (1) streamline the pollutant load reduction estimate process for planners, (2) assist plan reviewers with ensuring the scientific rigor of submitted watershed-based plans, and (3) assist planners and stakeholders in deciding the amount and types of BMPs that are effective for the target pollutants.</p> <p>The major project goal is to provide and distribute an up-to-date reference database of agricultural BMP studies. The second goal is to conduct a meta-analysis of the studies to provide planners and stakeholders with useful science-based metrics of BMP effectiveness. The final major goal is to share the data and tools with the watershed planning community. Ultimately this process will help planners in the development of effective watershed-based plans.</p>

Measures of Success (Expand from Summary Page)
<p>Success will be measure by (1) delivery of an agricultural BMP study database, which will include individual study results for different parameters, (2) delivery of a technical report that summarizes the meta-analysis conducted on the studies included in the database, and (3) delivery of the database and associated information to stakeholders. Stakeholder feedback will be used to evaluate the effectiveness of the tool for planners and included in project final reports.</p>

2017 Texas NPS Management Program Reference (Expand from Summary Page)
Components, Goals, and Objectives
Component 1 – Explicit short- and long-term goals, objectives, and strategies that protect surface... water.
LTG – Objective 2: Support the implementation of state, regional, and local programs to prevent nonpoint source pollution through assessment, implementation, and education
LTG – Objective 3: Support the implementation of state, regional, and local programs to reduce nonpoint source pollution, such as the implementation of strategies defined in TMDL I-Plans, WPPs, and other water quality planning efforts in the state.
STG 2, Objective B <ul style="list-style-type: none"> - Develop and implement BMPs to address constituents of concern or water bodies not meeting water quality standards in watershed identified as impacted by nonpoint source pollution.
STG 3, Objective C <ul style="list-style-type: none"> - Expedite development of technology transfer activities to be conducted to increase BMP implementation.
STG 3, Objective D <ul style="list-style-type: none"> - Conduct outreach through the CRP, SWCDs, and others to enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.

Estimated Load Reductions Expected (Only applicable to Implementation Project Type)
N/A

Part III – Financial Information

Budget Summary	
Category	Total
Personnel	\$ 51,818
Fringe Benefits	\$ 18,817
Travel	\$ 156
Equipment	\$ 0
Supplies	\$ 75
Contractual	\$ 0
Construction	\$ 0
Other	\$ 4,800
Total Direct Costs	\$ 75,666
Indirect Costs (\leq 15%)	\$ 11,350
Total Project Costs	\$ 87,016

Budget Justification		
Category	Total Amount	Justification
Personnel	\$ 51,818	<p>Michael Schramm, Principal Investigator: \$54,998 annually, 2 mo. (8.33% per year) – \$9,579 Research Specialist: \$55,000 annually, 6 mo. (25% per year) – \$27,912 Research Associate: \$52,200 annually, 2 mo. (8.33% per year) – \$8,827 Program Manager: \$64,970 annually, 1 mo. (4.17% per year) – \$5,500 *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in aggregate, will not exceed total effort estimates for the entire project.) *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount.</p>
Fringe Benefits	\$ 18,817	<p>Fringe for faculty and staff is calculated at 18.8% salary plus \$825 per month. Fringe benefits for eligible students is calculated at 11% salary plus \$560 per month. *(Fringe benefits estimates are based on salary the estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in aggregate, will not exceed the overall estimated total.) *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount.</p>
Travel	\$ 156	<p>2 trips to Temple for meetings with TSSWCB project manager: 156 miles round trip × \$0.50 state vehicle rate × 2 trips = \$156</p>
Equipment	\$ 0	N/A
Supplies	\$ 75	Computer peripherals, including but not limited to keyboard and mouse.
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 4,800	<p>Communication Services @ \$75/hr: \$800 Website maintenance fees @ \$50/mo. for 24 mo.: \$1,200 Computer/Laptop: \$1,800 Publication Fees: \$1,000</p>
Indirect	\$ 11,350	<p>Per the RFP requirements, indirect costs are limited at 15% of total direct costs. \$75,666 Total Direct Costs * 15% = \$11,350</p>